

(19)



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(11)



EP 1 350 498 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.10.2003 Bulletin 2003/41

(51) Int Cl. 7: A61F 13/494

(21) Application number: 02007497.7

(22) Date of filing: 02.04.2002

(84) Designated Contracting States:

AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TRDesignated Extension States:
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(54) Method of applying elastic end pieces to an absorbent product and absorbent article produced thereby

(57) Starting from an elastic material web (37) and an absorbent product web (56), the inventive method involves removing a first material piece (44) from the elastic material web (37) to provide a second material piece (54) with an aperture (51) and applying the first piece (44) to a first portion (67) of the absorbent product

web (56). The second piece (54) is supplied to a second application station (57) and a section (61) of the second piece (54) is stretched and applied to a second portion (68) of the absorbent product web (56). In this way an absorbent product with elastic waist portions is manufactured efficiently and with a minimum of waste.

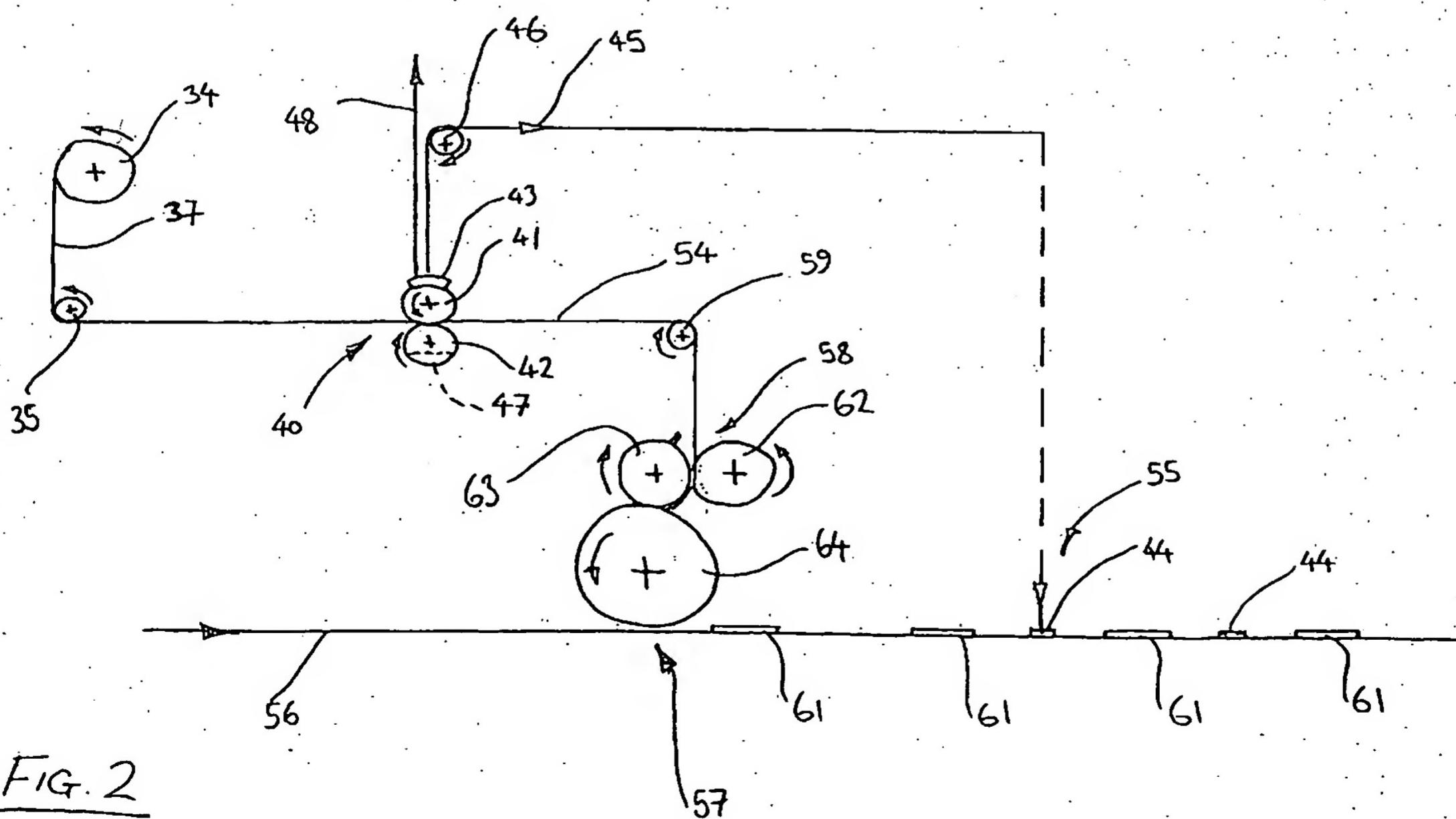


FIG. 2

Fig. 4 shows a stage following that in Fig. 3, whereby the second material piece is cut so as to form a series of second material piece sections which are separated from one another,

Fig. 5 shows a further stage following that shown in Fig. 4, whereby one second material piece section and one first material piece are applied to an absorbent product web.

Detailed description of preferred embodiments:

[0014] In Fig. 1, an absorbent product in the form of a disposable absorbent diaper produced by the method of the invention is shown in plan view with the top sheet 2 of said product uppermost. The back sheet 6 is hidden in the view shown, but is however generally co-extensive with the top sheet 2, which has longitudinal side edges 9 and 10 extending longitudinally from end edge 8 (as shown in dotted lines underneath elastic end piece 1) down to curved portion 13, 14 of the top sheet and extending onward to end edge 15.

[0015] An absorbent core, not shown for reasons of clarity, would typically be positioned between the top sheet 2 and the back sheet 6 of the absorbent product.

[0016] The product has two end portions, a first end portion 5 and a second end portion 3, portions 5 and 3 being attached by means of a crotch portion 4. Second end portion 3 is a rear end portion intended to lie in contact with the rear waist region of a wearer during use, while first end portion 5 is a front end portion intended to lie in contact with the front waist region of a wearer during use. The product may however be worn such that the first end portion 5 and the second end portion 3 are inverted.

[0017] There is also no exact dimension for each of these portions, although it is generally understood that the crotch portion is that portion which is approximately longitudinally and transversely centrally located in the product. A displacement of the crotch portion longitudinally towards the first end portion 5 is however common.

[0018] The second end portion 3 is provided with a continuous end piece 1, formed from elastic material. The elastic material is preferably a laminate having non-woven material forming each outer surface with an elastic lamina between these.

[0019] The elastic material of the end piece 1 is preferably formed to have elasticity only in the transverse direction (i.e. side-to-side in Fig. 1) and thereby substantially no elasticity in the longitudinal direction. This is of advantage for example in improving the fit of the absorbent product to the back of the wearer, since gathering of the rear part of the product in a longitudinal direction is easily prevented.

[0020] The end piece 1 (as will be explained further below) is one symmetrical half of a second material piece section 61 (see Fig. 4), and overlies the other components of the absorbent product. In the embodiment

shown, the end piece 1 overlies the combined top sheet 2 and back sheet 6, the standing gathers (of which the inner edges 16, 17 are depicted), the leg elastics 18, 19, as well as the absorbent core (not shown).

[0021] The end piece 1 of elastic material thus has a transverse end 8 extending from the outer edges 20, 21 of respective side flaps 22, 23, whereby the side flaps 22, 23 are to be understood as those portions of the continuous end piece 1 which extend beyond the longitudinal side edges 9, 10 at the second end portion 3.

[0022] The end piece 1 is fixedly attached to the underlying elements of the absorbent product by means of adhesive or welding, or by any other suitable method.

[0023] In order to form a pocket cuff 25 in the absorbent article, to act as a barrier and containment pocket in particular for faecal matter, the end piece 1 is fixedly attached, while in a stretched condition, to the underlying components. However the attachment is made only at locations which are longitudinally or laterally outside the dashed line 24. The inner, rectangular cut-out edge 26 of the pocket cuff 25 up to the line 24 is thus unattached to the underlying components.

[0024] The elastic material end piece 1 is hydrophobic in order to function so as to contain fluids within the pocket cuff 25. However, it is undesirable to continue the elastic end piece 1 in the central part of the product 4 all the way down to the inner end edges 27, 28 of the end piece 1, since too great an area of the wearer may be juxtaposed to the hydrophobic layer and this may lead to leakage, especially when the wearer is lying on his/her back. Thus the rectangular cut-out indicated by edge 26 is provided in order to leave sufficient material remaining in the end piece 1 for forming the leg cut-outs 29, 30, but at the same time providing a recessed pocket cuff 25 which is less likely to result in leakage problems.

[0025] Releasable attachment means 31, 32, preferably of the mechanical fastening type such as hook-and-loop type fastening means (such as Velcro® for example) are provided on the side flaps 22, 23. Such releasable attachments are well known to the skilled person and thus no further detailed description is provided here. These are adapted to releasably attach to complementary portions 11, 12 provided on the back sheet 6 of the first end portion 5 of the product. The portions 11 and 12 cover the corner areas of the back sheet 6 and have inner margins shown with partly slanted dashed lines ending in shorter longitudinal sections just inside the edges of piece 33. Such releasable attachment of the complementary releasable attachment means in the end portions may be made, in a manner known per se, after the absorbent product has been passed through the legs of a wearer in order to locate the crotch portion 4 in alignment with the user's crotch.

[0026] At the first end portion 5, there is a further elastic end piece 33 in the form of a rectangular strip. Other shapes of strip are however also possible such as a half-oval shaped strip for example. This end piece 33 is placed, in the embodiment shown, on top of all the com-

station 40, the material web thus comprises an aperture 51. The material web 37 exiting the cutting station 40 and containing the aperture 51 will be referred to as a second material piece 54. The second material piece 54 is thus still in the form of a single web, but comprises an aperture 51. The second material piece 54 may also contain the further apertures 52, 53, if already formed at that stage.

[0041] As will also be clear from the following, the aperture 51 corresponds to double the size of a cut out portion 26 in the first elastic end portion 1 described above.

[0042] An absorbent product web 56, is fed by means (not shown) from left to right in Fig. 2. Absorbent product web 56 is fed through both a second application station 57 and a first application station 55. Although the first application station 55 is shown downstream of the second application station 57, it may equally be placed upstream thereof.

[0043] After exiting the cutting station 40, the second material piece 54 is diverted by guide roller 59 to a third station 58 comprising a further cutting device 63 and a slip device 62.

[0044] The purpose of the cutting device 63 is to cut the second material piece web transversely at successive locations 60 (see also Fig. 4) which are substantially midway across the aperture(s) 51. The slip device 62 has the purpose of forming a separation in the direction of arrows "A" between the second material piece 54 and a second material piece section 61 cut from said second material piece 54.

[0045] As will be apparent from Fig. 4, the second material piece section 61 corresponds to two first elastic end pieces 1 (shown in Fig. 1) placed back-to-back across a line of symmetry B-B. The leg cut-outs 29, 30 and rectangular cut-outs 26 thus comprise half of the apertures 52, 53 and 51 respectively, while the cut-outs 29', 30' and 26' are half of the next set of apertures 52', 53', and 51'.

[0046] From the condition shown in Fig. 4, the second material piece section 61 must then be stretched before being applied to the absorbent product web 56. In order to do this, the second material piece section 61 is transferred to a stretching device 64, which in the embodiment shown simultaneously rotates and stretches the section 61 before applying same to the absorbent product web in a stretched condition at the second application station 57. Suitable means (not shown) are used for fixedly securing the section 61 in said stretched condition to the absorbent product web 56. Such means may comprise adhesive application means, welding means such as an ultrasound welding device, or any other suitable device which can provide a fixed attachment of the section 61 to the absorbent product web 56.

[0047] The section 61 comprises both a middle section and two end portions, whereby the end portions form side flaps 22, 23 in the waist region. Since the elastic material of the side flaps does not need to be attached

to any further underlying non-elastic material in the embodiment shown, an advantage in handling and reliability is obtained in the method of the invention when attaching the elastic section 61 to the absorbent product

5 web 56 only at its transverse central region. This is because the section 61 only needs to be stretched by an amount sufficient for providing elasticity in the waist band area, thus by an amount of typically between 25 and 75%. Therefore, even though the side flaps 22, 23 10 may require to be extended by an amount between 100% and 200% or more (and in some cases even greater extensions of up to 300% or more), the method of attachment of the invention merely requires the section 61 to be stretched by between 25% and 75% when 15 being applied to the web 56, resulting in relatively low forces acting to remove the elastic section 61 from the device 64 and from the absorbent web 56 after application and attachment. This method may be contrasted with prior art attempts at producing elasticated waist areas, in which elastic material in one piece is stretched 20 by amounts up to or over 200%, over all of its length, and then applied to both a non-elastic waist region and non-elastic side flap regions in order to elasticate the side flaps to the required amount, even though the waist region need not be elasticated by the same amount.

[0048] Fig. 5 shows a plan view of the absorbent product web 56, whereby components such as standing gathers, leg elastics 18, 19 etc., have not been shown so as to aid clarity of the Figure. One or more of these 25 components may however be present.

[0049] The web 56 has two longitudinal side edges 65 and 66. These longitudinal side edges correspond to, and will form, the longitudinal side edges 9, 10 of the absorbent product shown in Fig. 1.

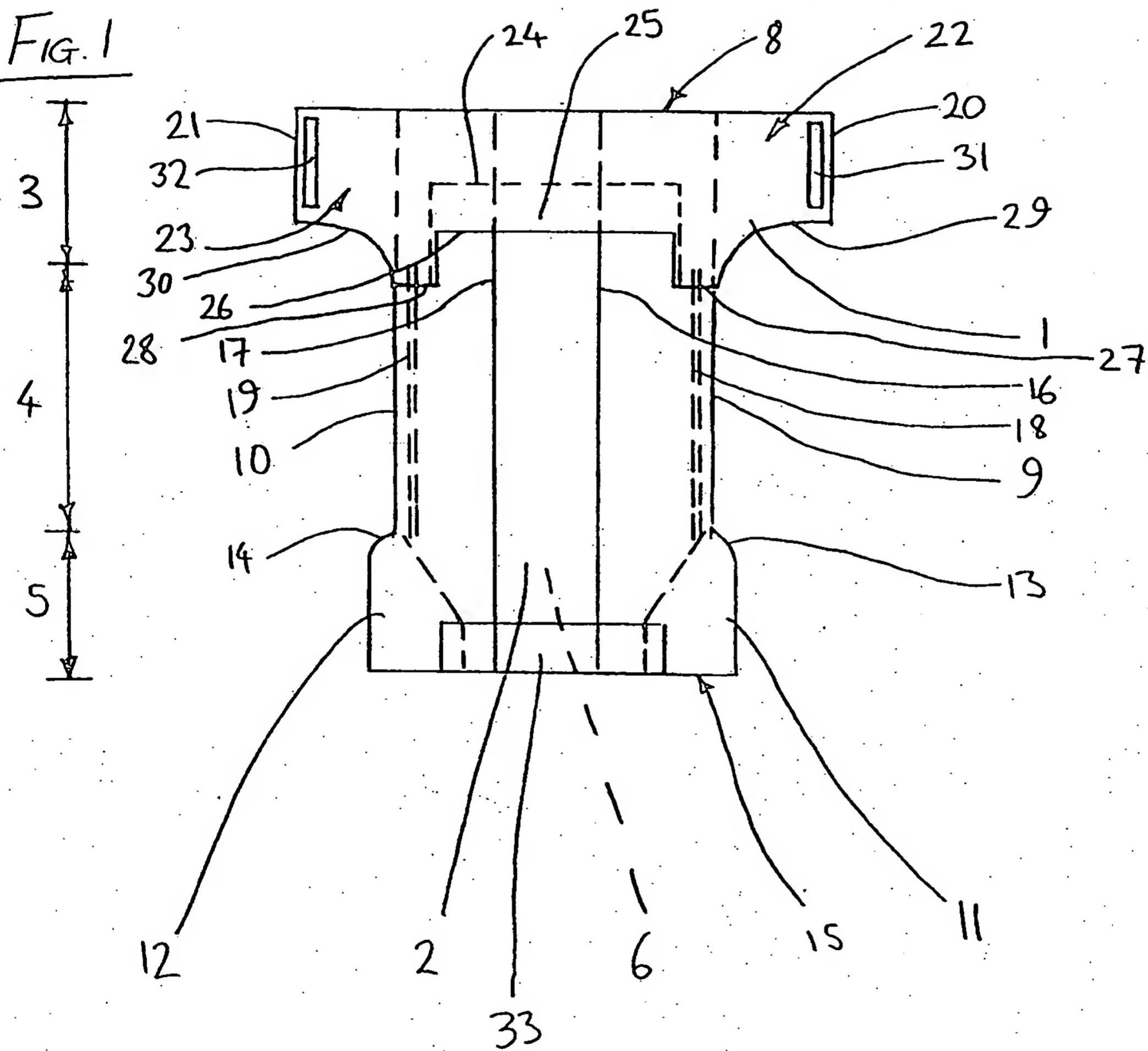
[0050] The first material piece 44 is applied, and fixedly attached, preferably in a stretched condition of between 25% and 75% elongation, to a first end portion 67 (cf. the first, single, end portion 5 in Fig. 1) of the absorbent product web 56. The first end portion 67 of the web 56 in the embodiment shown comprises the first or front waist end portions of two adjacent absorbent products. The material piece 44 is thus placed substantially symmetrically across a line of intended separation C-C. The reference numerals 11, 11' and 12, 12' are inserted to show, with respect to Fig. 1 for example, where the complementary attachment portions 11, 12 would be located on one side of line C-C.

[0051] Similarly, section 61 is applied, and fixedly attached in a stretched condition, to a second portion 68 of said absorbent product web 56 which second portion 68 is located at the second waist end portions (cf. the second, single, end portion 3 in Fig. 1) of two adjacent absorbent products. The section 61 is attached symmetrically with respect to the intended line of separation D-D between two absorbent product second waist end portions.

[0052] The location of the attachment is such that an inner transverse end section of the second material sec-

- absorbent products, and wherein said first material piece (44) is placed symmetrically across an intended separation line (C-C) between said adjacent absorbent products.
9. Method according to any one of the preceding claims, wherein said absorbent product web (56) has longitudinal side edges (65, 66) and wherein said second material piece section (61) is applied to said absorbent product web (56) such that portions of said second material piece section (61) extend beyond the respective longitudinal side edges (65, 66) of said absorbent product web (56) to thereby form side flap members (22, 23).
10. Method according to claim 9, wherein said second material piece section (61) is applied to said second portion (68) by being stretched between 25% and 75% and then being attached to said second portion (68) in said stretched condition.
11. Method according to any one of the preceding claims, wherein a further material piece (49, 50) is removed at each longitudinal side edge (38, 39) of said second material piece (54) or said elastic material web (37), in longitudinal alignment with said at least one aperture (51), prior to the application of said second material piece section (61) to said absorbent product web (56), so as to form leg cut-out areas (29, 30, 29', 30') in said second material piece (54).
12. Method according to any one of the preceding claims, wherein subsequent to removal of at least one of said first material pieces (44), said second material piece (54) is fed to a third station (58) for cutting said second material piece (54) into said second material piece sections (61), said cutting being performed in a transverse direction with respect to the longitudinal side edges (38, 39) of said second material piece (54) and at locations (60) bisecting said aperture(s) (51), and then separating said second material piece sections (61) from each other before stretching and applying same to said absorbent product web (56).
13. Method according to any one of the preceding claims, wherein said second material piece section (61) is applied to said absorbent product web (56) so as to be fixedly attached thereto, such that with respect to absorbent products intended to be formed from said absorbent product web (56), an inner transverse end section of said second material piece section is unattached to the absorbent product web (56) over only a part of its longitudinal extent and only a part of its transverse extent to thereby form a pocket cuff (25).
14. Method according to any one of the preceding claims, wherein releasable fastening means (31, 32) are fixedly attached to said second material piece section (61) at longitudinal side edges thereof (20, 21; 38, 39) so as to provide releasable attachment means for cooperating with releasable fastening means (11, 12) located on said first portion (67).
15. Method according to any one of the preceding claims, wherein, subsequent to the application of at least one of said first material pieces (44) and at least one of said second material piece sections (61) to said absorbent product web (56), said absorbent product web (56) is separated into a plurality of absorbent products by cutting transversely with respect to the longitudinal side edges (65, 66) of said absorbent product web (56) at a location (C-C) generally bisecting said first material pieces (44) and at a location (D-D) generally bisecting said second material piece sections (61).
16. Method according to any one of the preceding claims, wherein the elastic material web (37) has elasticity only in the transverse direction.
17. Absorbent product comprising a first end portion (5), a second end portion (3) and an intermediate crotch portion (4) joining said first end portion (5) to said second end portion (3), said first end portion (5) being provided with a first elastic end piece (1) and said second end portion (3) being provided with a second elastic end piece (33), wherein said first elastic end piece (1) includes an inner edge (27, 28) provided with a cut-out (26), and said second elastic end piece (33) is formed as a strip having dimensions equal to those of the cut-out (26) when both said first elastic end piece (1) and said second elastic end piece (33) are in an unstretched condition.
18. Absorbent product according to claim 17, wherein said first elastic end piece (1) extends in a transverse direction across said product so as to form elastic side flaps (22, 23) in said second end portion (3), and wherein said second elastic end piece (33) forms a waist elastic in said first end portion (5).

FIG. 1



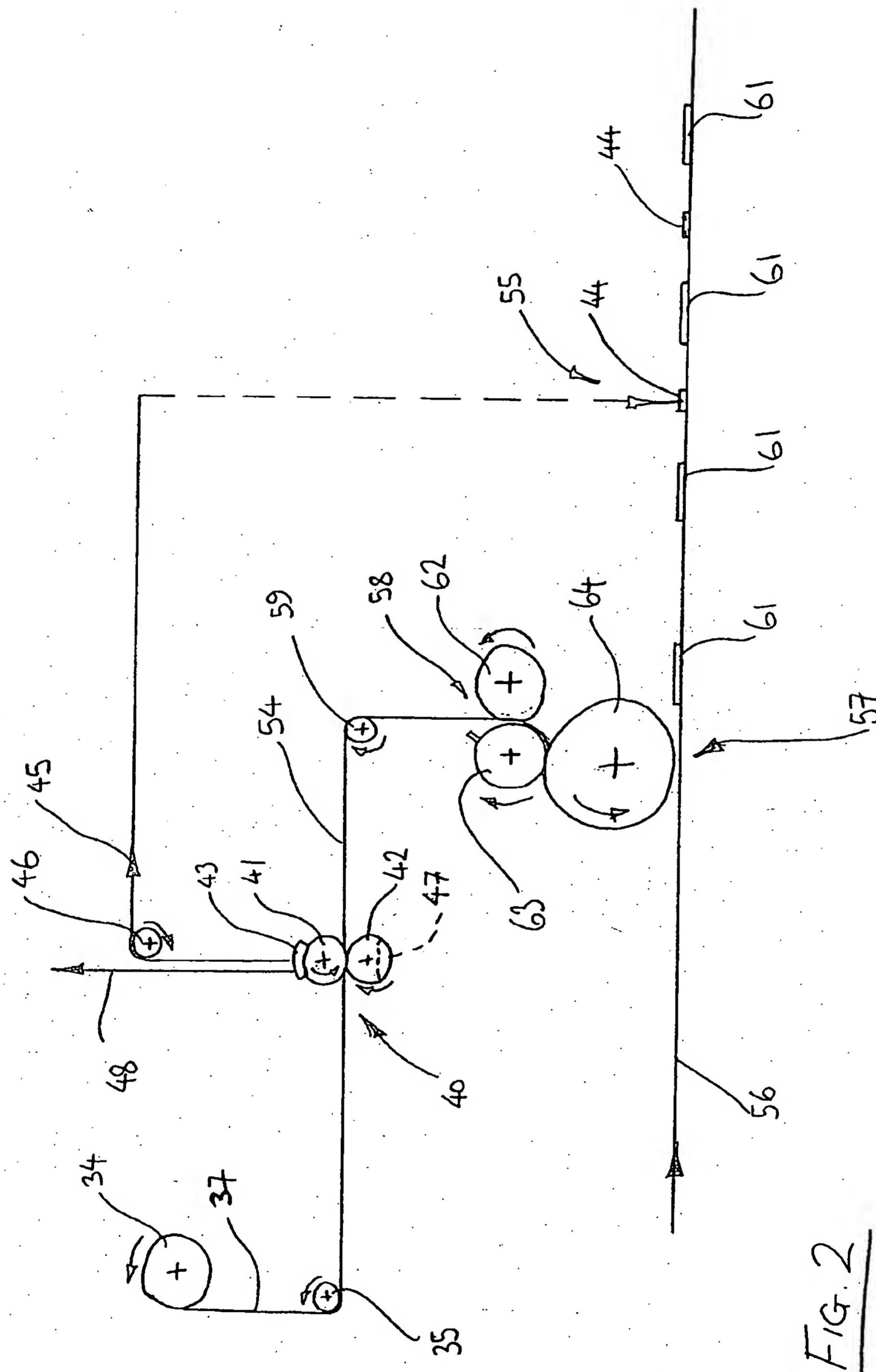
FIG. 2

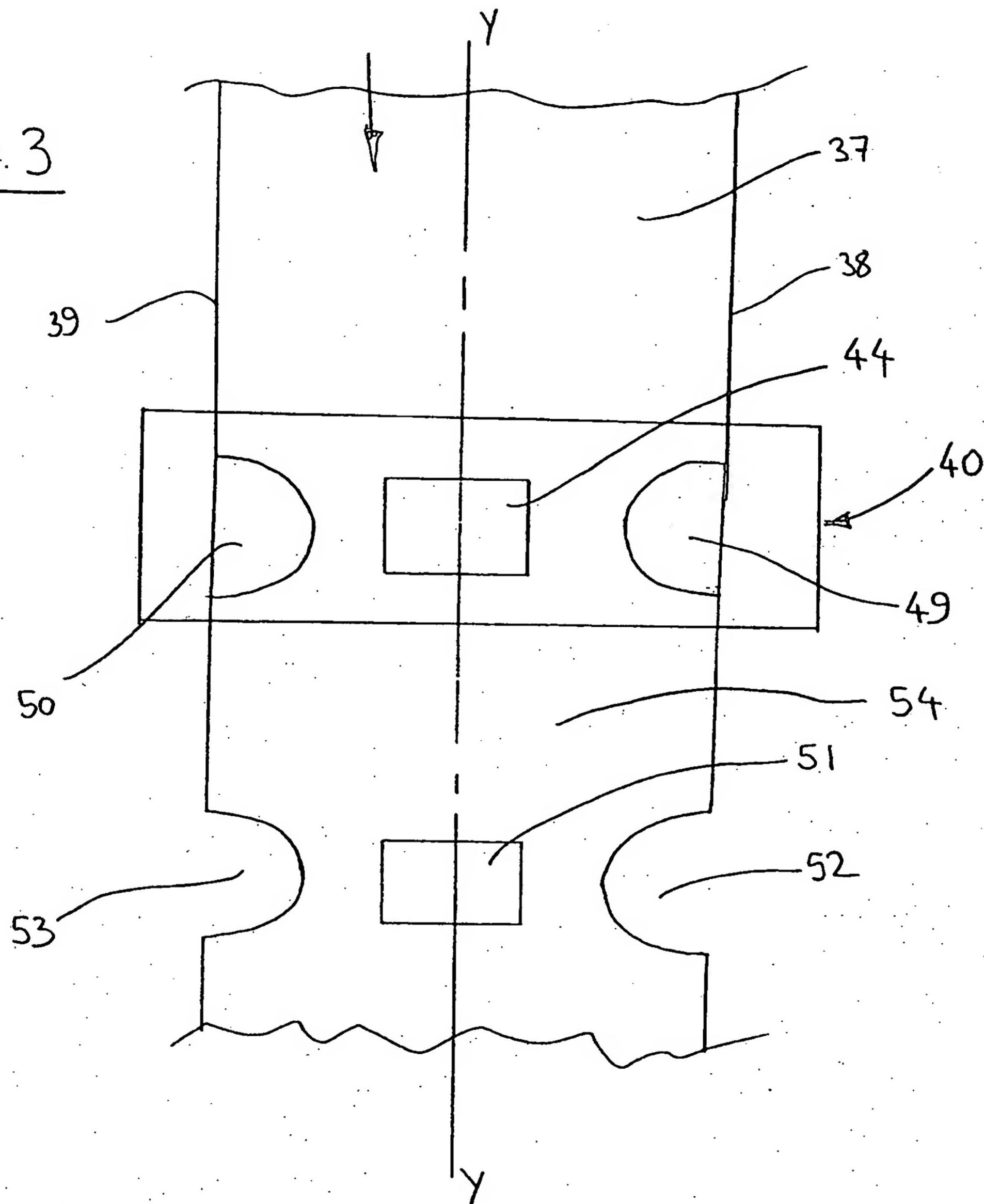
FIG. 3

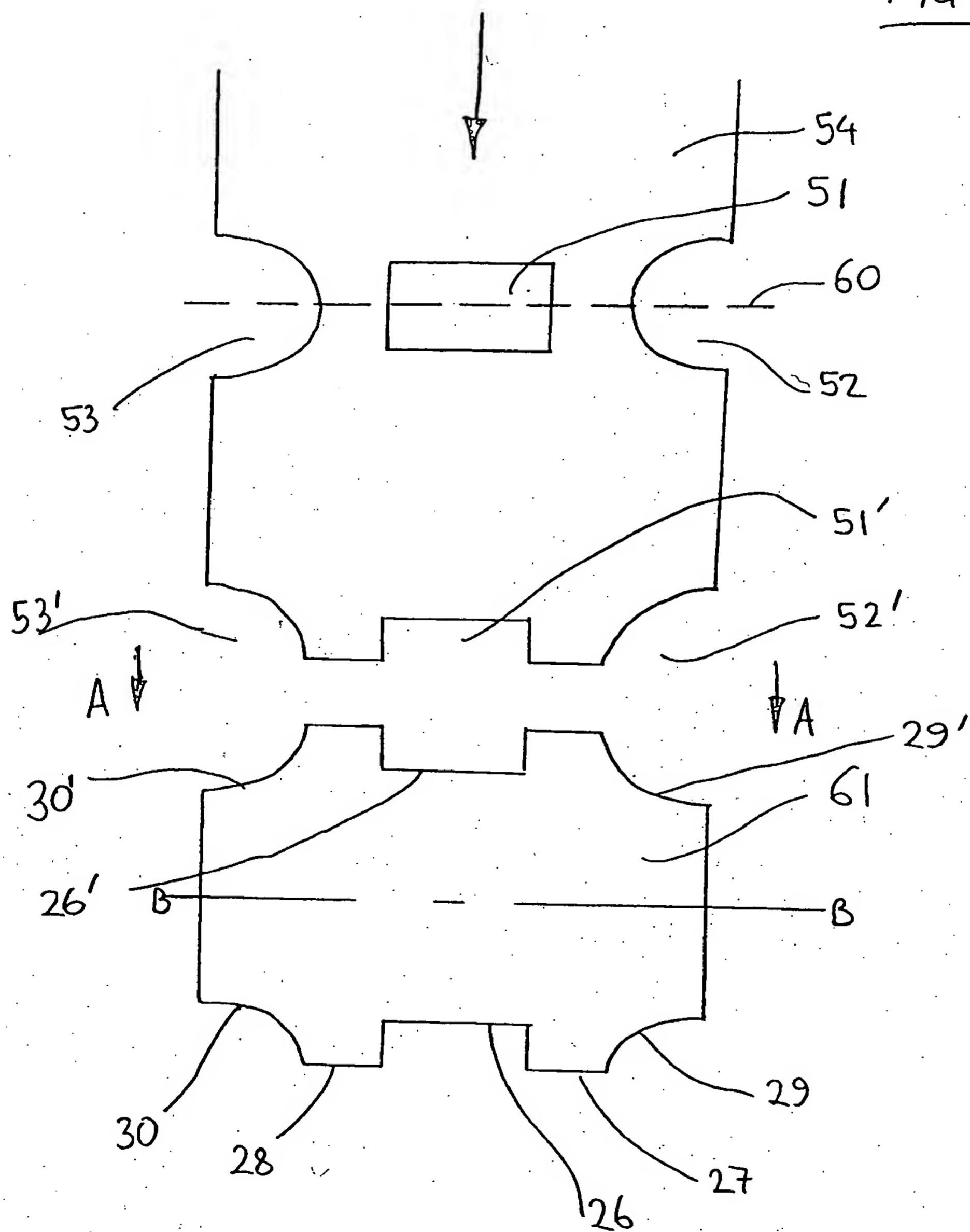
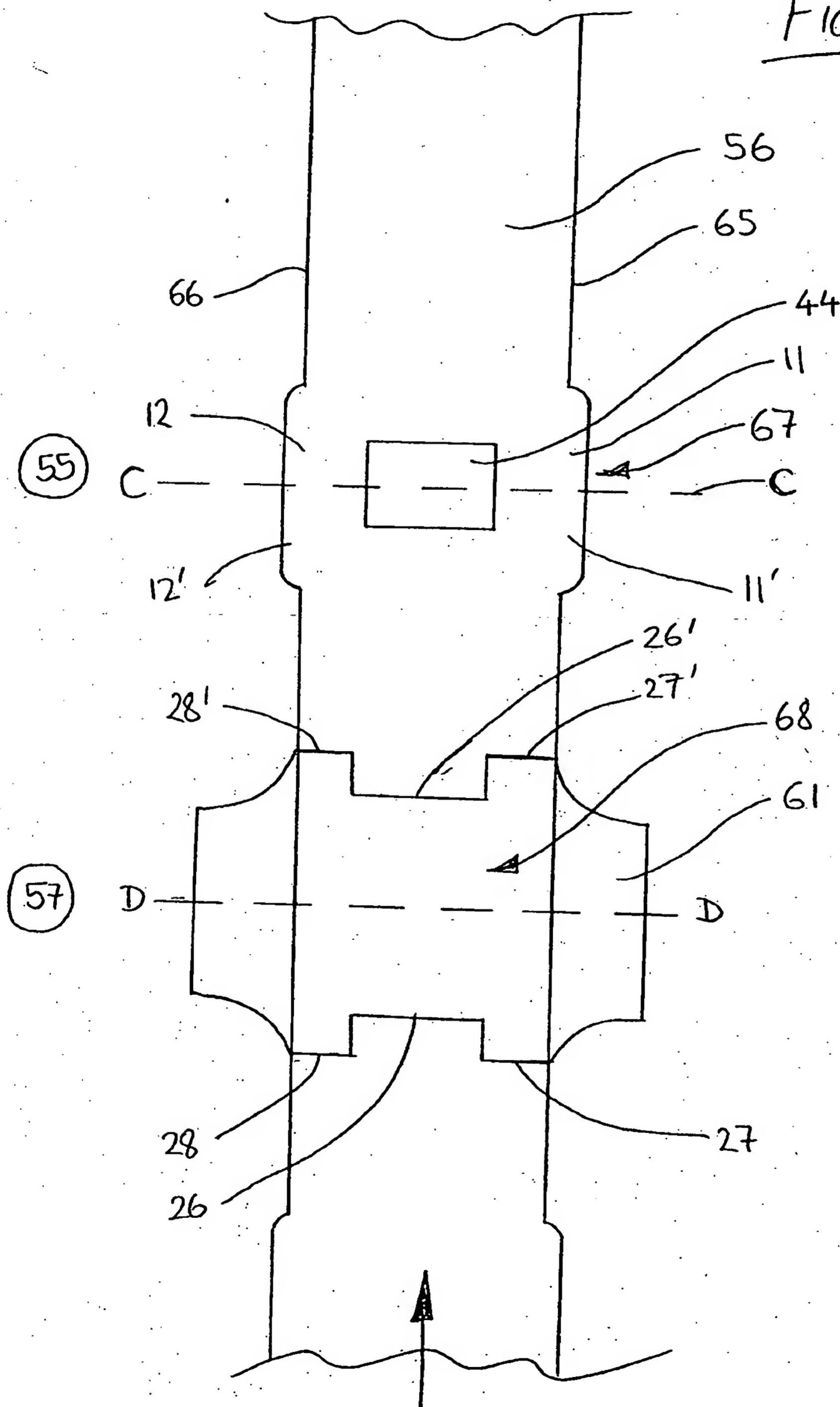
FIG. 4

FIG. 5





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EUROPEAN SEARCH REPORT

Application Number
EP 02 00 7497

DOCUMENTS CONSIDERED TO BE RELEVANT									
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.)						
Y	WO 02 24131 A (CONFAB SERVICES AG ; GLAUG FRANK S (US)) 28 March 2002 (2002-03-28) * page 29, paragraph 2; claim 4; figure 5 * ---- WO 00 47152 A (KIMBERLY CLARK CO) 17 August 2000 (2000-08-17) * page 19, line 28 – page 20, line 6 *	17	A61F13/494						
			TECHNICAL FIELDS SEARCHED (Int.Cl.)						
			A61F						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 33%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>16 September 2002</td> <td>Mirza, A</td> </tr> </table> <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>				Place of search	Date of completion of the search	Examiner	THE HAGUE	16 September 2002	Mirza, A
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